

REMARKS

Applicant hereby replies to the Office Action of Nov. 3, 2004, in the above-referenced patent application. Prior this reply, Claims 1-12 were pending in the application. Through this reply, claims 5 and 12 have been canceled. As such, claims 1-4 and 6-11 are pending in the application. Claims 1 and 6-9 were rejected, and Claims 2-4 and 10-11 were objected to as depending on rejected base claims, but were deemed allowable if rewritten in independent form including the limitations of base claims and any intervening claims. Applicant wishes to thank the Examiner for detailing the allowable claims.

Drawings

The Examiner contends that the material illustrated in Fig. 4 is prior art. In accordance with the Examiner's requirements, Fig. 4 has herein been amended to include a "Prior Art" legend. Applicant respectfully requests that the objection to the drawings be withdrawn. A replacement sheet for Fig. 4 designating the drawing as "prior art" is enclosed.

Claim Objections

The Office Action objected to Claims 4 and 5 as being duplicates. Applicant has herein deleted claim 5. The Office Action objected to claims 11 and 12 as being duplicates. The Applicant has herein deleted claim 12. The Applicant respectfully requests that the objections be withdrawn.

The Office Action objected to Claims 3-4 and 10-11 for failing to describe the subject matter completely. However, the mathematical relations describe the subject matter with accuracy as understood and utilized by one of ordinary skill in the art. Applicant respectfully submits that one ordinarily skilled in the art would understand the boundaries and parameters of the matrix formulas. The Applicant directs the Examiner to the specification for further information such as, for example, pages 7-12.

For example, generally $\{f\}_{M \times N}$ represents a digital image or a digital picture composed of $M \times N$ digital pixels in which M and N represent the height (the number of the samples in the vertical direction, or the number of lines) and the width (the number of the samples in horizontal direction), respectively. Therefore, $f(m, n)$ represents the n th pixel value of the m th line of the input image. Relation (7) for f_L represents the absolute value of the difference between $f(m, n)$ and $f(m, n-1)$. Relation (8) for f_R represents the absolute value of difference between $f(m, n)$ and $f(m, n+1)$. Relation (6) for $d(m, n)$ is the minimum of f_L and f_R . Further, f_U is the absolute value of difference between $f(m, n)$ and $f(m+1, n)$. In addition $x(m, n)$ and $y(m, n)$ are clearly defined by relations (9) and (10). It is respectfully submitted that one of ordinary skill in the art would find ample teachings in the specification and sufficient description of the parameter functionality for the mathematical relations. Therefore, Applicant respectfully requests that the objection to the claims be withdrawn.

Claim rejections under 35 U.S.C. 102(b)

Rejection of Claims 1, 6-8 under 35 USC 102(b) as being anticipated by USPN 5,038,388 to Song is respectfully traversed because Song does not disclose all of the claimed limitations.

Regarding Claim 1, Song does not disclose “obtaining a positive non-zero weighting factor to control a degree of enhancement,” as required by Claim 1. The values *c* in col. 7, lines 21-22 of Song (relied on by the Examiner), are not required to a positive non-zero value. Song does not limit the values *c* as claimed herein.

Further, Song col. 7, lines 2-6 (relied on by the Examiner), does not disclose “selecting edge pixel values representing a boundary of an edge in the first image,” as required by Claim 1. In col. 2, lines 6-7 (relied on by the Examiner), Song simply mentions enhancing the edges and details of an image without disclosing the step of specifically selecting pixel values that represent boundary of an edge, as claimed. General image enhancement in Song does not disclose the step of selecting pixel values that define boundary of an edge for further processing according to the present invention. According to the present invention, shoots are likely to occur at edge boundaries, and as such are specifically selected for shoot suppression. The Examiner has not met the burden of showing that the claimed limitations are disclosed.

Further, Song does not disclose “defining a gain suppressing function having attenuation coefficients to be multiplied with particular pixel values of the high-pass image signal

corresponding in location to the edge pixel values,” as required by Claim 1. In col. 9, lines 19-20 (relied on by the Examiner) Song only mentions: “Next, an adaptive amplification factor s which varies from 0 to 1 is determined using the generalized statistical variance of pixel values around the pixel value to be enhanced, $v(i,j)$, and an estimate of the image noise power of the system (block 260, FIG. 2).” Despite the Examiner’s interpretation, Song’s adaptive amplification factor s is not the same as a gain suppressing function, as claimed. The Examiner has not explained how Song’s adaptive amplification factor s discloses a gain suppressing function, as claimed. The Examiner has not met the burden of showing how the claimed limitation is disclosed by Song.

Further, according to the present invention, the gain suppression function is defined based on the selected pixel values that define an edge. Such a gain suppression function has attenuation coefficients that are to be multiplied with particular pixel values corresponding in location to the edge pixel values. Such limitations are not disclosed by, and do not apply to, Song’s general image enhancement method, and which is not specifically sensitive to edges as that claimed invention herein. For at least these reasons, rejection of Claim 1 and all rejected claims dependent therefrom should be withdrawn.

Regarding Claims 6 and 7, as discussed in relation to Claim 1, Song does not disclose selecting pixels that define an edge in the image. As such, for at least the reasons provided in relation to Claim 1, Song does not disclose selecting pixels that define an edge in the horizontal

or vertical direction, as claimed. Figs. 3E-H in Song simply show a set of pixels, but there is no disclosure that pixels that define an edge in the vertical or horizontal direction are specifically selected for shoot suppression according to the claimed invention.

Rejection of Claims 1, 6-8 under 35 USC 102(b) as being anticipated by Scognamiglio, Ramponi, Rizzi and Albani, “A Rotational Unsharp Masking Method for TV Applications”, 1999 (Hereinafter “Scognamiglio”), does not disclose all of the claimed limitations.

At the outset, Applicant wishes to point out that the rejections under Scognamiglio are vague because the Examiner has not provided specific references to locations in Scognamiglio where the Examiner believes disclosures that anticipate the claimed invention are provided. If the claims are once again rejected, Applicant respectfully requests that the Examiner provide specific references to disclosure by including e.g. symbol references, page numbers, paragraph numbers, column numbers, line numbers, etc. in Scognamiglio such that Applicant can respond to such specific disclosure if it exists. Further, in rejecting the claims the Examiner assumes that many of the claimed limitations are inherent in the references, even though the references do not lend themselves to such assumptions and the Examiner has not provided a lucid explanation of such inherency or references to backup such assumptions.

Regarding Claim 1, Scognamiglio does not disclose “obtaining a positive non-zero weighting factor to control a degree of enhancement,” as required by Claim 1. The value λ in

Scognamiglio Section 2.1 (relied on by the Examiner) is not defined as a weighting factor to control degree of enhancement. Further, the value λ in Scognamiglio Section 2.1 is not required to a positive non-zero value. Scognamiglio does not limit the value λ as claimed herein.

Further, Scognamiglio Section 2 (relied on by the Examiner), does not disclose “selecting edge pixel values representing a boundary of an edge in the first image,” as required by Claim 1. Scognamiglio mentions enhancing the edges and details of an image without disclosing the step of specifically selecting pixel values that represent boundary of an edge, as claimed. General image enhancement in Scognamiglio does not disclose the step of selecting pixel values that define boundary of an edge for further processing according to the present invention. According to the present invention, shoots are likely to occur at edge boundaries, and as such are specifically selected for shoot suppression. The Examiner has not met the burden of showing that the claimed limitations are disclosed.

Further, Scognamiglio does not disclose “defining a gain suppressing function having attenuation coefficients to be multiplied with particular pixel values of the high-pass image signal corresponding in location to the edge pixel values,” as required by Claim 1. In Section 2.1 (relied on by the Examiner) Scognamiglio mentions a proposed algorithm formed by a set of directional highpass filters, followed by nonlinear correlation filters. Despite the Examiner’s interpretation, Scognamiglio does not disclose a gain suppressing function defined based on the selected pixel values that define an edge. Such a gain suppression function has attenuation

coefficients that are to be multiplied with particular pixel values corresponding in location to the edge pixel values. Such limitations are not disclosed by Scognamiglio as the Examiner contends.

Further, Scognamiglio does not disclose “multiplying the high-pass image signal by the weighting factor and by the gain suppressing function to obtain a result,” as required by Claim 1. The definition $u_s(n,m,t)$ in Scognamiglio is a spatial filter operating on three frames that suppress noise while preserving sharpness of moving objects. The definition of $u_s(n,m,t)$ does not include multiplication of three elements which include a high-pass image signal, a weighting factor and a gain suppressing function, as claimed. If the Examiner believes otherwise, the Examiner is requested to cite by name, the elements in Scognamiglio that form the claimed limitations.

Scognamiglio does not include the steps of “adding the result to the first image signal to obtain an enhanced image signal in which the shoots have been suppressed,” as required by Claim 1. The Examiner has not disclosed wherein Scognamiglio it is disclosed that the image signal is added to product of the high-pass image signal, the weighting factor and the gain suppressing function. For at least these reasons, rejection of Claim 1 and all rejected claims dependent therefrom should be withdrawn.

Claim rejections under 35 U.S.C. 103(a)

Rejection of Claim 9 under 35 USC 103(a) as being unpatentable over Scognamiglio is respectfully traversed because Scognamiglio does not teach or suggest all of the claimed limitations. As discussed above, Scognamiglio does not disclose all of the limitations of Claim 1. Further, as the Examiner states Scognamiglio does not disclose that “the gain suppressing function inherently performs the step of selecting the edge pixel values,” as required by Claim 9. The Examiner has not provided any support for the contention that the claimed limitation is obvious. The Examiner assumes that the claimed limitation is simply a combination of functions, and therefore obvious. This assumption is respectfully traversed. If Claim 9 is once again rejection Applicants respectfully request that the Examiner provide support for the assumption. The cited references, alone or in combination do not disclose the claimed limitations. No *prima facie* case of obviousness has been established.

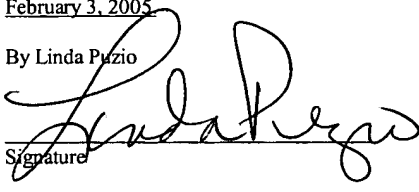
Rejection of Claim 9 under 35 USC 103(a) as being unpatentable over Song is respectfully traversed because Song does not teach or suggest all of the claimed limitations. As discussed Song does not teach or suggest all of the claimed limitations. As discussed above, Song does not disclose all of the limitations of Claim 1. Further, as the Examiner states Song does not disclose that “the gain suppressing function inherently performs the step of selecting the edge pixel values,” as required by Claim 9. The Examiner has not provided any support for the contention that the claimed limitation is obvious. The Examiner assumes that the claimed limitation is simply a combination of functions, and therefore obvious. This assumption is respectfully traversed. If Claim 9 is once again rejection Applicants respectfully request that the

Examiner provide support for the assumption. The cited references, alone or in combination do not disclose the claimed limitations. No *prima facie* case of obviousness has been established.

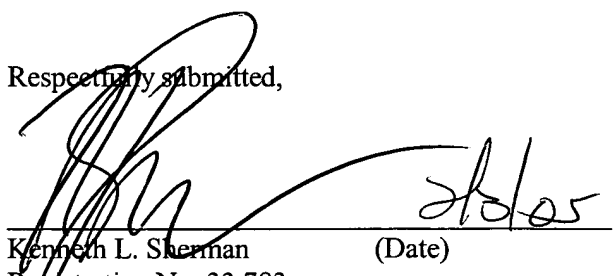
Conclusion

For these, and other, reasons, Applicants believe that the claims are in condition for allowance. Reconsideration, re-examination, and allowance of all claims are respectfully requested.

If necessary, the Commissioner is hereby authorized to charge payment or credit or any overpayment to Deposit Account No. 01-1960 for any additional fees required with respect to this filing.

| CERTIFICATE OF MAILING | |
|---|---|
| I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on February 3, 2005 | |
| By Linda Puzio |  |
| Signature | |
| February 3, 2005 | |

Respectfully submitted,


Kenneth L. Sherman (Date)
Registration No. 33,783
Myers, Dawes & Andras & Sherman LLP
19900 MacArthur Blvd., Suite 1150
Irvine, CA 92612
(949) 223-9600